Reprinted for private circulation from CHILD DEVELOPMENT
Vol. 37, No. 3, September 1966

OBSERVATIONAL LEARNING AS A FUNCTION OF SYMBOLIZATION AND INCENTIVE SET

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This study investigated the effects of symbolization on delayed reproduction of modeling stimuli in a test of the contiguity-mediational theory of observational learning. During exposure to the behavior of a film-mediated model, 1 group of children engaged in concurrent verbalization, a second group observed passively, while a third group engaged in competing symbolization. Half of the children in each of the treatment conditions observed the model's behavior under a positive incentive set; the remaining Ss were provided no incentive to learn the model's responses. Ss who generated verbal equivalents of the modeling stimuli during exposure subsequently reproduced more matching responses than the passive viewers, who, in turn, showed a higher level of acquisition than children in the competing symbolization treatment. Observational learning, however, was not influenced by incentive set.

Most conceptualizations of imitative or observational learning have been developed and tested largely on the basis of a limited paradigm requiring observing *Ss* to perform matching responses and to secure positive reinforcers as a precondition for their acquisition (Baer & Sherman, 1964; Miller & Dollard, 1941; Skinner, 1953). These theories, however, fail to account for the occurrence of delayed reproduction of modeling behavior originally learned by observers under exposure conditions permitting no overt performance of matching responses (Bandura, 1962; 1965a; Bandura & Walters, 1963). Since observers can acquire only perceptual and other implicit responses resembling the sequences of modeling stimuli while they are occurring, symbolic processes which mediate subsequent behavioral reproduction must play a prominent role in observational learning.

Recent theoretical analyses of observational learning (Bandura, 1965c;

This work was supported by Public Health Service research grant M-5162 from the National Institute of Mental Health. Author's address: Department of Psychology, Stanford University, Stanford, Calif. 94305.

Sheffield, 1961) emphasize the role of stimulus contiguity and associated cognitive or representational responses in the acquisition process. According to contiguity-mediational theory, during the period of exposure modeling stimuli elicit in observing Ss configurations and sequences of sensory experiences which, on the basis of past associations, become centrally integrated and structured into perceptual responses.

There is some evidence from research in sensory conditioning (Conant, 1964; Leuba, 1940; Naruse & Abonai, 1953) to suggest that, in the course of observation, transitory sensory and perceptual phenomena can be converted to retrievable images of the corresponding stimulus events. In addition to imaginal responses, the observer acquires, once verbal labels have become attached to objective stimuli, verbal equivalents of the model's behavior during the period of exposure (Bandura, 1965b; Bandura, Ross, & Ross, 1963). The latter findings thus provide some basis for assuming that symbolic or representational responses in the form of images and verbal associates of the model's behavior constitute the enduring learning products of observational experiences. It is likewise assumed in the contiguity-mediational theory that symbolic matching responses possess cue-producing properties that are capable of eliciting, some time after observation, overt responses corresponding to those that were modeled, provided the requisite components exist in the observer's behavioral repertoire.

In order to test the proposition advanced in the above theory that symbolization enhances observational learning, a modeling study was conducted in which an attempt was made to manipulate the relevant symbolic responses. Viewers' verbalizations of modeling stimuli would be expected to influence mediating or representational response processes. Therefore, during the response-acquisition phase of the experiment, one group of children engaged in facilitative verbalization designed to enhance the development of imaginal and verbal associates of the model's behavior. A second group of children simply observed passively, while the third group of children assigned to a competing symbolization condition produced interfering verbal responses intended to counteract the establishment of representational responses.

The degree of observational learning may also be partly governed by incentive-related sets which exert selective control over the direction, intensity, and frequency of observing responses. It is also entirely possible that different symbolization instructions could create in observers differential anticipations as to the possibility of their later being called upon to demonstrate what they had learned from the modeled stimulus presentation. Such self-induced sets, if operative, might affect attending behavior and thus confound the effects of symbolization processes. Hence, in the present study half of the Ss in each of the three observational treatments were offered positive incentives to learn the model's response patterns, while the remaining children were provided no incentives.

It was predicted that the number of matching responses acquired observationally by children in the facilitative symbolization condition would exceed the corresponding scores for the passive observers, who, in turn, would show a higher level of acquisition than Ss in the competing symbolization treatment. It was also hypothesized, for reasons given above, that incentive set would enhance observational learning.

METHOD

Subjects

The Ss were 36 boys and 36 girls ranging in age from 6 to 8 years. They were drawn from two elementary schools in a lower-middle-class community.

Design and Procedure

The investigation utilized a 2 × 2 × 3 factorial design. Children of each sex were randomly assigned to either the facilitative symbolization, the passive observation, or the competing symbolization conditions. Half of the Ss in each of the latter experimental treatments participated in the incentive-set condition, while the remaining children were assigned to the no-incentive-set group. Thus, there were six groups of six Ss each.

The Ss in the facilitative symbolization group were instructed to verbalize every action of the model as it was being performed in the movie. With children in the competing symbolization group, *E* explained that she was interested in determining whether children could pay close attention to a movie while engaging in another activity simultaneously. They were therefore to count "1 and a 2, and a 3, and a 4, and a 5" repeatedly, at the same time that they watched closely the filmed presentation. The Ss in the passive observation group were instructed simply to pay close attention to the movie.

Children who were assigned to the incentive-set condition were also informed that following the movie they would be asked to demonstrate what they had learned and that they would receive candy treats for each item that they reproduced correctly. On the other hand, Ss in the no-incentive-set group were told that they would return to their classroom immediately following the movie.

Following the instructional procedures, *E* turned on the movie projector, which displayed the modeling stimuli on a glass lens screen in the television console.

The movie consisted of a 4-minute color film in which an adult male model exhibited a series of relatively novel patterns of behavior and often utilized play materials in unusual ways. Since this study was concerned with issues of response acquisition, it was necessary to devise unusual response sequences that have virtually a zero probability of occurring spontaneously in preschool children and hence meet the criterion of novel responses. In the opening scene the model entered the room with his right hand cupped over his eyes. He then clasped his hands behind his back as he surveyed the various play materials.

In the first action sequence the model built a tower with blocks arranged in a unique manner and set a plastic juice dispenser, which was to serve as a target, on top of the tower. After picking up a dart gun and a baton, the model paced off a specified number of steps from the target, placed the baton on the floor to mark the range, got down on one knee, and fired the dart gun at the plastic container. The block tower was then disassembled in a distinctive way. In the next action sequence, which was directed toward a large Bobo doll, the model sat on the doll, punched it in the nose, pummeled it with a mallet, tossed rubber balls at it, lassoed it with a hoola hoop, and dragged it with the improvised lariat to a far corner of the room. The model then picked up two bean bags and paced off backward a designated number of steps from the target, which consisted of an upright board with three large holes. After reaching the starting point, the model tossed the bean bags between his legs with his back to the target. He then retrieved the bags, paced backward, squatted with his back to the target, and tossed a bean bag over each shoulder. The closing scene showed the model walking across the room whirling the hoola hoop over his right arm.

Delayed imitative performance is determined not only by observational variables but also by rehearsal processes which typically improve retention. An incentive set may, therefore, influence the amount of behavioral reproduction by both augmenting and channeling observing responses during acquisition, and actuating deliberate implicit rehearsal of matching responses immediately after exposure. Since the present experiment was primarily concerned with issues of response acquisition, and the occurrence of differential anticipatory rehearsal would obscure results, children in all groups were assigned the task of counting out loud during the brief period between the end of the movie and reproduction. By this procedure, an attempt was made to hold interpolated activities constant for all groups and to prevent facilitative rehearsal of responses. Immediately after the completion of the movie, *E* announced that they would now proceed to another room in the mobile laboratory, and that she was interested in seeing how high they could count while they walked to the other end of the trailer. Since the interpolated task was highly dissimilar to the modeled activities, it was not expected to reduce retention to any great extent.

Test for Acquisition

The test for acquisition was administered by a second female experimenter in a room containing the stimulus items that were utilized by the model in the filmed performance. In order to control for any possible *E* influences, the person who conducted this phase of the study did not know to which treatment conditions Ss had been assigned.

The children were asked by *E* to demonstrate all of the model's responses they could recall, and were praised and rewarded with candy for each matching response correctly reproduced. A standardized cuing procedure was employed to insure the same order of reproduction for all Ss. They were asked to show the way in which the model behaved in the opening scene of the movie; to demonstrate what he did with the dart gun, the Bobo doll, and the bean bags; and to portray the model's behavior in the closing scene of the film. The children were thus given a fragmentary cue and asked to reproduce the entire response sequence in which the particular stimulus object was employed.

The *E* recorded the children's matching responses on a checklist containing the 38 responses that had been exhibited by the model. In order to provide an estimate of interscorer reliability, the performances of ten children were recorded simultaneously but independently by another rater who observed the test sessions through a one-way mirror from an adjoining observation room. The two raters were in perfect agreement on 96 per cent of the specific matching responses that were scored.

RESULTS

Table 1 presents the mean number of matching responses achieved by children in the various treatment conditions. In each incentive condition,

TABLE 1

MEAN NUMBER OF MATCHING RESPONSES REPRODUCED AS A FUNCTION OF SYMBOLIZATION AND INCENTIVE-SET CONDITIONS

	OBSERVATIONAL CONDITIONS		
INCENTIVE	Facilitative Symbolization	Passive Observation	Competing Symbolization
No Incentive Set:			
Boys	16.8	14.5	11.5
Girls	17.5	13.2	6.0
Total	17.2	13.8	8.7
Incentive Set:			
Boys	16.2	15.3	13.0
Girls	14.8	11.7	9.8
Total	15.5	13.5	11.4

for both boys and girls, the mean reproduction scores attained by the active symbolizers exceeds the corresponding means for the passive observers who, in turn, show a higher level of acquisition than Ss in the competing symbolization treatment. Analysis of variance of these data reveals that symbolization is a highly significant source of variance ($F = 13.01$; $p < .001$).

Further comparisons of pairs of means by the t test indicate that Ss who generated verbal equivalents of the modeling stimuli during presentation subsequently reproduced significantly more matching responses than children who either observed passively ($t = 2.18$; $p < .025$) or engaged in competing symbolizations ($t = 5.12$; $p < .001$). Moreover, the passive viewers acquired more of the model's repertoire of behavior than children who engaged in verbalizations designed to interfere with the development of representational responses ($t = 2.94$; $p < .01$).

It is of interest that boys reproduced a significantly higher number of matching responses than girls ($F = 5.70$; $p < .05$). Contrary to prediction, however, observational learning was not influenced by incentive set nor were there any significant interaction effects.

DISCUSSION

Although the results of the present study provide confirmatory evidence for the facilitative role of symbolization in observational learning, alternative interpretations of these findings might be examined. It is conceivable that the method utilized for preventing the acquisition of representational responses may have interfered with observation of the modeling stimuli. Considering, however, that the modeling stimuli were projected on a large television screen directly in front of the S seated in a dark room, it is improbable that, under such conditions of highly focused attention, concurrent competing verbalization could reduce appreciably the occurrence of observing responses. Indeed, the replies of children in the incentive-set condition to questions in the postexperiment interview indicate that they exerted strong efforts to observe and to retain the responses exhibited by the model ("While I was counting, I was paying attention to the thing. I thought back about it in my head . . . I look at it all the time so I remember it all the time").

The marked external control of observing responses through the televised mode of stimulus presentation in all likelihood accounts to some extent for the absence of a significant incentive effect on the acquisition of matching behavior. As several of the children put it, "I didn't look all over the place. I just watched the movie and kept my eyes on it. . . . I kept watching. I couldn't take my eyes off it."

In situations where a person is exposed to multiple models exhibiting diverse patterns of behavior, knowledge of the reinforcement contingencies

associated with the corresponding response patterns and anticipation of positive or negative reinforcement for subsequent reproduction may exert selective control over the nature and frequency of attending responses. The effects of incentive set on observational learning would, therefore, be most clearly elucidated by a comparative study utilizing stimulus situations ranging from (*a*) highly focused observation of a single sequence of modeling stimuli or (*b*) controlled exposure to multiple models requiring selective attentiveness to competing social cues presented simultaneously to (*c*) self-selection of frequency and duration of exposure to specific types of models. The latter condition, which corresponds most closely to observational learning in naturalistic situations, would probably maximize the influence of reinforcement-oriented set.

The hypothesis concerning the influence of anticipated positive reinforcement for matching responses on observational learning was based on presumed perceptual sensitizing effects of an incentive set induced prior to exposure. The fact, however, that *Ss* who expected to be subsequently tested and rewarded for their imitative behavior generally achieved slightly lower acquisition scores than their uninformed counterparts suggests that the benefits of incentive set may have been offset by detrimental effects. There were indications in the interview data, elicited by questions about the children's thoughts during the film-viewing, that the incentive-set instructions generated achievement anxieties in some of the children. ("I was thinking what should I tell you and what should I do. . . . I was just thinking, I hope I remember everything.") Observational learning could be adversely affected by implicit rehearsal of preceding events and disruptive thoughts concerning an impending test if these competing cognitive activities occur while the modeling stimuli are being presented at a relatively rapid rate. Any deleterious consequences should be greatest, as was the case, among the active symbolizers who were in the optimal film-viewing condition and, therefore, would most likely be hindered by the additional motivational effects of expectation of a performance test following the exposure session.

The small but nevertheless significant sex differences in acquisition scores is probably due, in part, to the fact that the modeled responses involved physical masculine-typed activities. The girls' more adverse reaction to the incentive set may also have been a contributing factor.

A single brief exposure to a continuous series of modeling stimuli is likely to produce some interference in the acquisition and correct sequencing of novel matching responses. Dramatic intrusions from the various sequential patterns were occasionally evident in *Ss'* behavioral reproductions, as in the case of the child who fired the dart gun at the Bobo doll, when, in fact, the plastic container served as the modeled target. Massed exposure conditions may thus result in the development of some erroneous modeling responses and the loss, through interference, of previously acquired ones.

Simultaneous competing verbalizations during observation of modeling displays would not be expected to interfere too extensively with the development of visual imagery, particularly when the modeling stimuli are highly salient, as in the present experiment. It would, therefore, be of considerable theoretical significance to determine whether any matching responses could be reproduced if, in addition to preventing the development of verbal associates, visual imaginal responses were likewise precluded, masked, or obliterated. Such imagery-interference procedures would provide the most decisive evidence as to whether representational mediators are necessary for long-term retention and delayed behavioral reproduction of modeling stimuli.

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